CLAIMS:

1. A method for creating brightness filters:

said brightness filters being adapted in use for an image projection system which projects divided images on a curved screen respectively from a plurality of projectors with adjacent ones of said divided images partially overlapped to reproduce a combined image, said filter being designed to adjust brightness of said divided images for harmonizing the brightness of the overlapping areas with the brightness of non-overlapping areas to make said combined image seamless, said method comprising the steps of:

(a) producing a screen model reflecting a shape of said curved screen;

(b) setting projection points respectively for projecting therefrom said divided images on said screen model, said projection points being different from each other in conformity with said projectors, respectively;

(c) allocating one of said divided images to a reference image and allocating each of the adjacent divided images to a peripheral image;

(d) setting a view point that is coincident with the projection point of said reference image;

(e) obtaining a 2-dimensional reference area of said reference image that is rendered on said screen model and is viewed from said view point;

(f) obtaining a 2-dimensional peripheral area of said peripheral image that is rendered on said screen model and is viewed from said view point;

(g) extracting an overlapping area of said 2-dimensional reference area that overlaps with the 2-dimensional peripheral area;

(h) making a brightness correction for either said overlapping area or said non-overlapping area with regard to said 2-dimensional reference area;

(i) providing a brightness filter for said reference image that realizes said brightness correction;

(j) allocating another divided image to said reference image and repeating the steps of (d) to (i) for providing said brightness filter for each of said divided images.

2. The method as set forth in claim 1, wherein

said method employs a frame buffer for storing said 2-dimensional reference area and said 2-dimensional peripheral area, respectively,

said 2-dimensional reference area being divided into discrete elements having corresponding addresses in said frame buffer,

said 2-dimensional peripheral area being divided into discrete elements having corresponding addresses in said frame buffer,

said step (g) comparing said addresses of the 2-dimensional reference area with said addresses of the 2-dimensional peripheral area to define said overlapping area as having the common addresses.

3. A virtual space creation system, said system comprising:

a curved screen offering a wide field of view;

an image creation module, said image creation module dividing a single seamless image into a plurality of divided images which are intended to be projected on said curved screen;

a plurality of projectors, said projectors project said divided images respectively on said curved screen in a partially overlapping relation with each other;

wherein said image creation module has a brightness filter for each of said divided images, said brightness filters being prepared by the steps of;

(a) producing a screen model reflecting a shape of said curved screen;

(b) setting projection points respectively for projecting therefrom said divided images on said screen model, said projection points being different from each other in conformity with said projectors, respectively;

(c) allocating one of said divided images to a reference image and allocating each of the adjacent divided images to a peripheral image;

(d) setting a view point that is coincident with the projection point of said reference image;

(e) obtaining a 2-dimensional reference area of said reference image that is rendered on said screen model and is viewed from said view point;

(f) obtaining a 2-dimensional peripheral area of said peripheral image that is rendered on said screen model and is viewed from said view point;

(g) extracting an overlapping area of said 2-dimensional reference area that overlaps with the 2-dimensional peripheral area;

(h) making a brightness correction for either said overlapping area or said non-overlapping area with regard to said 2-dimensional reference area;

(i) providing a brightness filter for said reference image that realizes said brightness correction;

(j) allocating another divided image to said reference image and repeating the steps of (d) to (i) for providing said brightness filter for each of said divided images.

4. The virtual space creation system as set forth in claim 3, wherein said curved screen is in the form of a concavity having a horizontal axis and a vertical axis, said concavity being curved with respect to said horizontal axis as well

as said vertical axis.

5. The virtual space creation system as set forth in claim 3, wherein said image creation module further includes a distortion correction scheme which corrects said divided image in order to minimize a distortion appearing in said divided image that is viewed from a particular view point.

6. The system as set forth in claim 3, wherein said projectors are divided into a first group and a second group, the projectors in said first group projecting said divided images respectively as right-eye images, and the projectors in said second group projecting said divided images respectively as left-eye images,
said system further including:
polarizing filters processing said right-eye image and said left-eye image into respective polarized images;
a pair of polarized glasses adapted to be worn by an observer, said a pair of polarized glasses combining said polarized images into a three-dimensional image.

7. The system as set forth in claim 3, wherein said projectors are divided into a first group and a second group, the projectors in said first group projecting said divided images respectively as right-eye images, and the projectors in said second group projecting said divided images respectively as left-eye images,
said system further including:
a shutter that interrupts alternately the right-eye images and said left-eye images being projected respectively from said projectors of the first group and the second group;
a pair of glasses adapted to be worn by an observer and having a right-eye lens and a left-eye lens, said glasses being provided with a switch that passes the right-eye image only through said right-eye lens and the left-eye image only through said left-eye lens in synchronous with the alternate interruption of said right-eye images and said left-eye images by said shutter.

8. The system as set forth in claim 3, further including;
an input device for selecting a direction and a speed, and
a scene controller which, in response to said direction and said speed, moves a scene of said divided images represented on said curved screen in said direction and at said speed.

9. The system as set forth in claim 3, further including;

an input device that gives an instruction for changing a content of said divided images, and

a content changer which, in response to said instruction, changes the content of said divided image.

10. A set of projectors adapted in use for a virtual space creation system which combines a plurality of divided images into a single image to be rendered on a curved screen, said projectors projecting said divided images respectively on said curved screen in a partially overlapping relation with each other, and being equipped with filters for adjusting brightness of said divided images for harmonizing the brightness of overlapping areas with the brightness of non-overlapping areas to make said single image seamless,

said filters being prepared by the steps of;

(a) producing a screen model reflecting a shape of said curved screen;

(b) setting projection points respectively for projecting therefrom said divided images on said screen model, said projection points being different from each other in conformity with said projectors, respectively;

(c) allocating one of said divided image to a reference image and allocating each of the adjacent divided images to a peripheral image;

(d) setting a view point that is coincident with the projection point of said reference image;

(e) obtaining a 2-dimensional reference area of said reference image that is rendered on said screen model and is viewed from said view point;

(f) obtaining a 2-dimensional peripheral area of said peripheral image that is rendered on said screen model and is viewed from said view point;

(g) extracting an overlapping area of said 2-dimensional reference area that overlaps with the 2-dimensional peripheral area;

(h) making a brightness correction for either said overlapping area or said non-overlapping area with regard to said 2-dimensional reference area;

(i) providing a brightness filter for said reference image that realizes said brightness correction;

(j) allocating another divided image to said reference image and repeating the steps of (d) to (i) for providing said brightness filter for each of said divided images.

11. A program for preparing brightness filters:

said brightness filters being adapted in use for an image projection system which projects divided images on a curved screen respectively from a plurality of

projectors with adjacent ones of said divided images partially overlapped to reproduce a combined image, said filter being given a brightness correction for adjusting the brightness of said divided images for harmonizing the brightness of the overlapping areas with the brightness of non-overlapping areas to make said combined image seamless, said program comprising:

(a) a screen model creation module for producing screen model reflecting a shape of said curved screen;

(b) a projection point setting module for setting projection points that project therefrom said divided images on said screen model, said projection points being different from each other in conformity with said projectors, respectively;

(c) a view point setting module which allocates one of said divided images to a reference image and allocates each of the adjacent divided images to a peripheral image, said view point setting module setting a view point that is coincident with the projection point of said reference image;

(d) a reference area capturing module that obtains a 2-dimensional reference area of said reference image that is rendered on said screen model and is viewed from said view point;

(e) a peripheral area capturing module that obtains a 2-dimensional peripheral area of said peripheral image that is rendered on said screen model and is viewed from said view point;

(f) an extracting module that extracts an overlapping area of said 2-dimensional reference area that overlaps with the 2-dimensional peripheral area;

(g) a brightness correction module that gives said brightness correction for either said overlapping area or said non-overlapping area with regard to said 2-dimensional reference area;

(h) a brightness filter creation module that provides a brightness filter for said reference image that realizes said brightness correction;

(i) a repeater module that allocates another divided image sequentially to said reference image and operating said modules for providing the brightness filter for each of the divided images.